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(54) Apparatus for evacuating and sealing bags, sealable wrappers or similar items of packaging material with articles therein in a substantially gastight manner

(57) Apparatus for evacuating and sealing bags 4 with articles 5 therein in a substantially gastight manner, comprises an evacuable chamber 8 for receiving a bag or bags or with an article therein, a device 10 for sealing the bag or bags, and a flexible envelope 12 located in the chamber. The envelope is filled with a gaseous medium such as air and expands when the surrounding pressure in the chamber is reduced thereby reducing the residual space within the chamber needing to be evacuated.

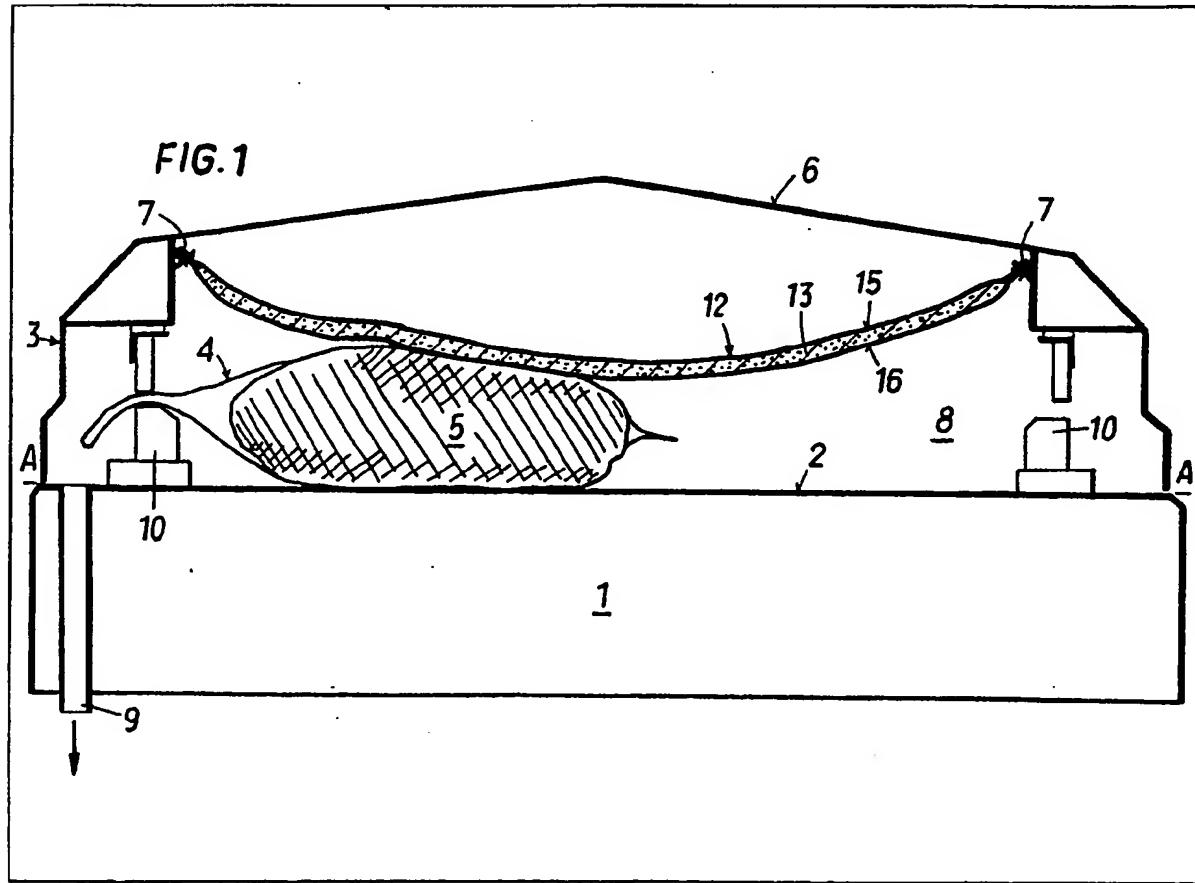


FIG. 1

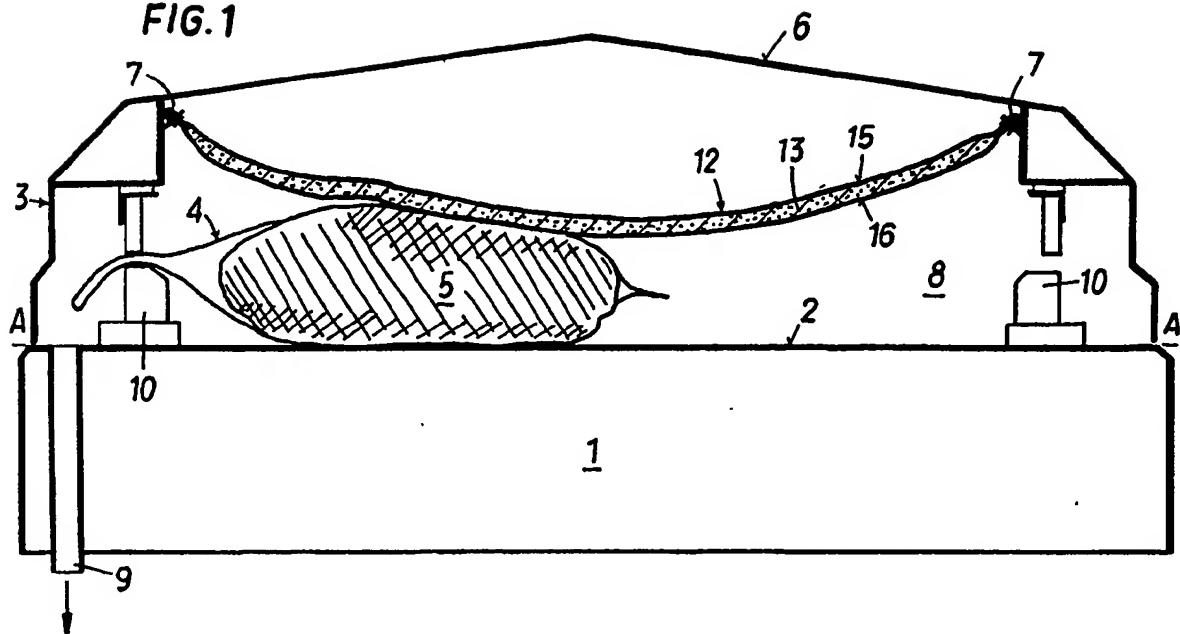


FIG. 2

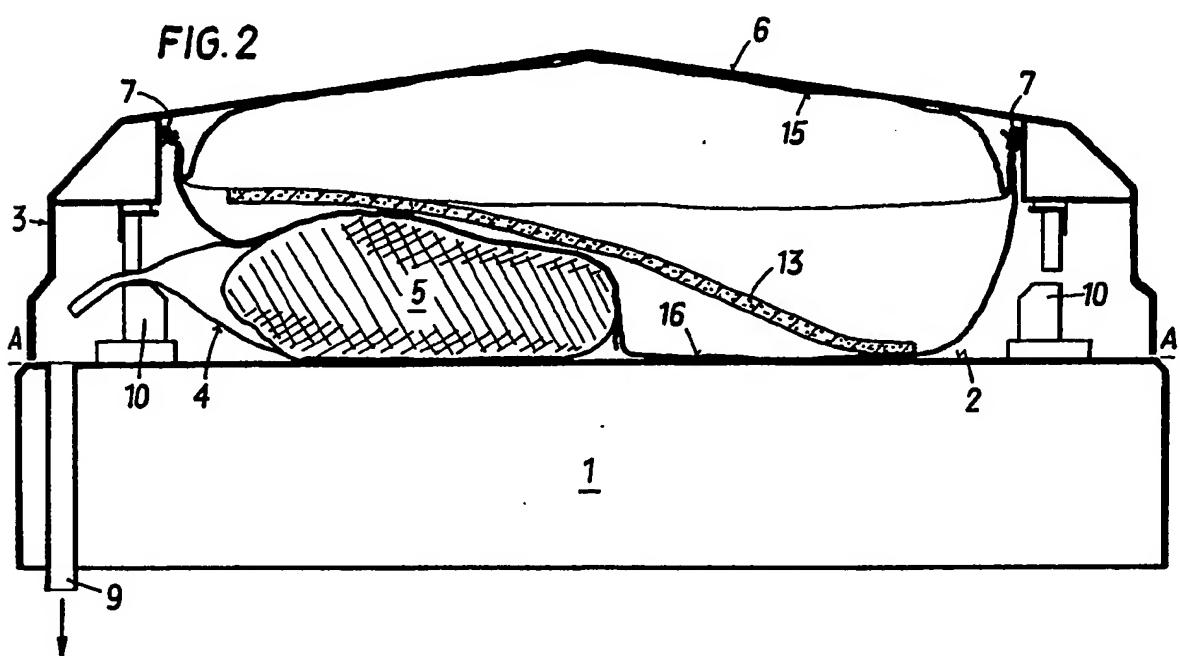


FIG.3

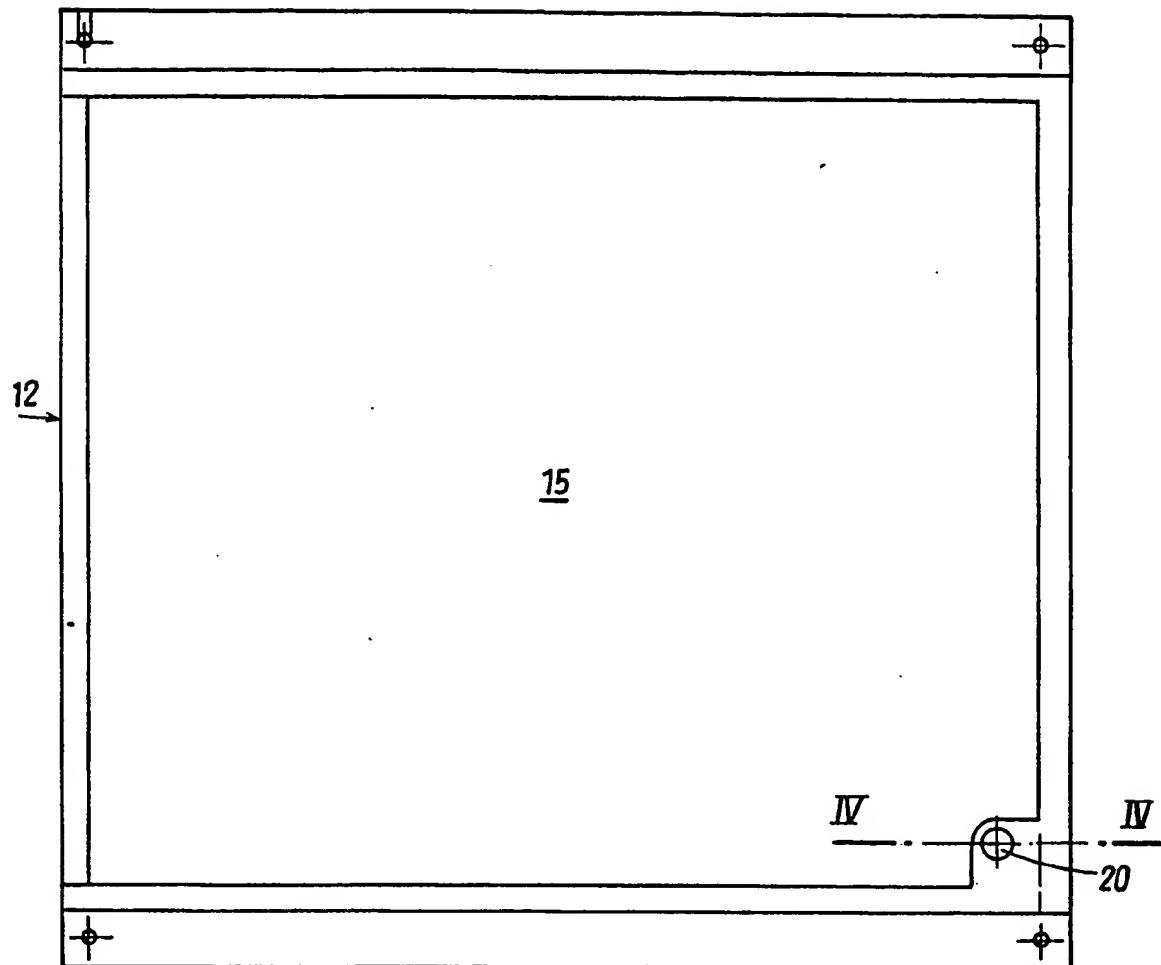
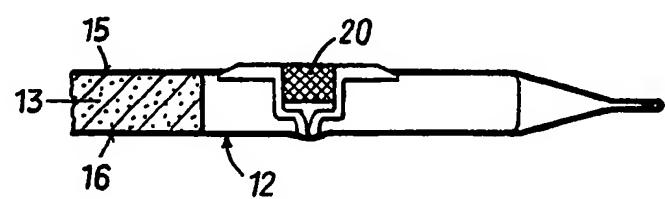
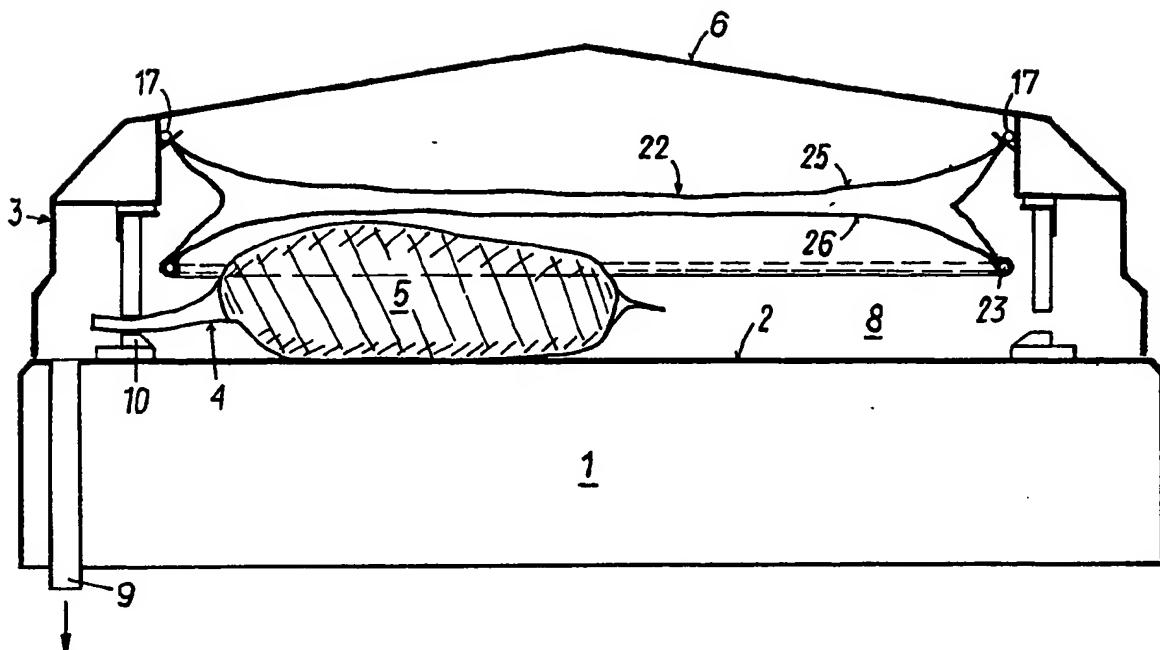
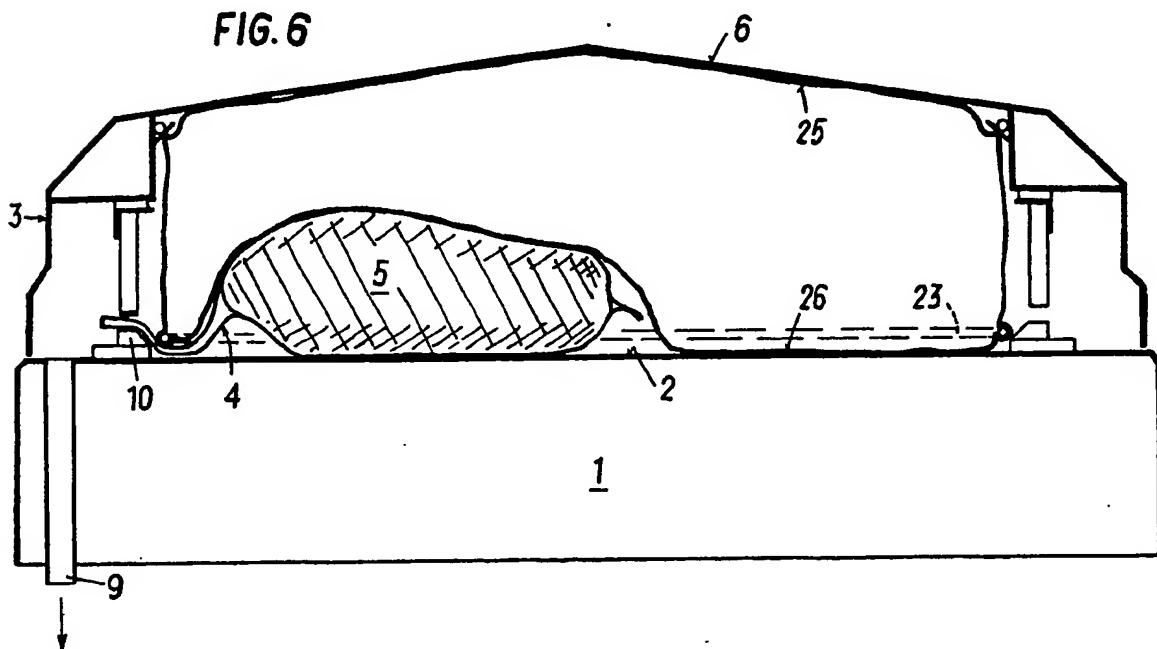


FIG.4



**FIG. 5****FIG. 6**

## SPECIFICATION

**Apparatus for evacuating and sealing bags, sealable wrappers or similar items of packaging material with articles therein in a substantially gastight manner**

The invention relates to apparatus for evacuating and sealing bags, sealable wrappers or similar items of packaging material with articles, for example foodstuffs, therein in a substantially gastight manner.

Foodstuffs, such as meat products, cheese, or similar products, and other articles, such as machine-components or industrial items, which are to be packaged in bags, sealable wrappers or similar items of packaging material in a substantially gastight manner, are conventionally placed in a chamber which is capable of being evacuated to, for example, approximately 99.8% of a pure vacuum whereupon the bags etc. are weld-sealed. Air is then admitted into the chamber and the hermetically packaged articles removed therefrom.

The expenditure of time required for one working cycle amounts to approximately 40 to 50 seconds, around 5 to 10 seconds being required for placing the open bags in the chamber and for removing the weld-sealed bags from the chamber, around 20 to 35 seconds for evacuating the chamber, and around 5 seconds for the remaining operations. Since a very high vacuum must be achieved, the time required for one working cycle, on the one hand, and its effectiveness, on the other hand, depend on the capability of a vacuum pump used to evacuate the chamber.

Since, however, the capability of the vacuum pump cannot be increased at will, since it would otherwise become too expensive in comparison with the entire apparatus, there is consequently an upper limit to the capability of the vacuum pump in relation to the apparatus in question.

In order to be able to reduce the space which must be evacuated and thereby to reduce the evacuation time and/or the necessary capacity of the vacuum pump, it is known to insert filler-bodies into the space in the chamber around the bags etc. which are filled with articles, especially foodstuffs. However, the use of filler-bodies is disadvantageous insofar as they need to be manipulated into place, even if the provision of other and/or different filler bodies is not necessary in the case of each evacuating operation, but only in the event of a change in the size of the article to be packaged.

The present invention seeks to provide an apparatus for evacuating and sealing bags, sealable wrappers or similar items of packaging material with articles therein in a substantially gastight manner, whereby, by substantially filling a space around the bags, sealable wrappers or similar items of packaging material, the effectiveness of a vacuum pump during an evacuating operation of the space is increased, without any requirement for manual effort.

According to the present invention there is provided an apparatus for evacuating and sealing bags, sealable wrappers or similar items of packaging

material with articles therein in a substantially gastight manner, the apparatus comprising: an evacuable chamber for receiving at least one bag, sealable wrapper or similar item of packaging material with an article therein; means for sealing the at least one bag, sealable wrapper or similar item of packaging material; and an envelope located in the chamber, the envelope being filled with a gaseous medium and being expandable when the surrounding pressure in the chamber is reduced.

The mode of operation of the envelope located in the chamber is such that, as the chamber is evacuated, the gaseous medium contained in the envelope expands, as a result of which only the residual space inside the chamber which is not filled by the at least one bag, sealable wrapper or similar item of packaging material or by the expanded envelope need be evacuated, this residual space being markedly reduced by the expansion of the envelope. As a result a given vacuum pump can effect the evacuation of the residual space inside the chamber much more rapidly, or much more powerful evacuation can be achieved for the same effort.

In one embodiment, the chamber is defined by a supporting surface for the at least one bag, sealable wrapper or similar item of packaging material and by a cover which can be moved relative to the supporting surface, the envelope being retained by the cover.

The envelope may be formed by two approximately flat walls which are joined together along their outer edge.

In plan view, the envelope and cover may be approximately identical, the envelope being attached to the cover along a portion of its peripheral edge.

In one embodiment a body made of a resiliently deformable, porous material is located inside the envelope the space inside the envelope being connected to atmosphere by means of a valve. Thus, if the volume of gaseous medium contained in the envelope declines, as result of diffusion through the walls of the envelope, a predetermined volume of gaseous medium can be restored periodically. This

is achieved by the body made of resiliently deformable porous material expanding to the size of the envelope when the interior space of the envelope is connected to the open atmosphere by the valve, thereby restoring the predetermined volume of air in the envelope.

In another embodiment, the envelope has approximately the shape and extent of the chamber, and contains a volume of gaseous medium which is significantly smaller than its volume in the expanded but substantially unstretched condition. Preferably the volume of gaseous medium contained in the envelope amounts to approximately 0.5% to 1% of the volume of air which is contained in the chamber at atmospheric pressure.

The invention is illustrated, merely by way of example, in the accompanying drawings, in which:-

Figure 1 shows, in section, one embodiment of an apparatus according to the present invention prior to the beginning of an evacuating operation;

Figure 2 is a view similar to Figure 1, of the

apparatus at the end of the evacuating operation;

*Figure 3 shows a plan view of a gas-filled envelope of the apparatus;*

*Figure 4 is an enlarged section along the line IV-IV*

5 *in Figure 3;*

*Figure 5 shows, in section, another embodiment of an apparatus according to the present invention, prior to the beginning of an evacuating operation; and*

10 *Figure 6 is a view similar to Figure 5 of the apparatus at the end of the evacuating operation.*

Throughout the drawings like parts have been designated by the same reference numerals.

Referring first to Figures 1 to 3, there is illustrated

15 one embodiment of an apparatus 1 according to the present invention. The apparatus comprises a supporting surface 2 for holding articles or goods 5, especially foodstuffs, which are inserted into bags 4. A cap or cover 3 is located above the supporting 20 surface 2, this cover being movable relative to the supporting surface 2. The cover 3 together with the supporting surface 2 define an evacuable chamber. A line A indicates the plane along which the cover 3 can be raised clear of the remaining portion of the 25 apparatus 1. Inside the cover 3 is a space 8 which is capable of being evacuated via a line 9 leading to a vacuum pump (not shown). Welding devices 10 are located in the space 8, for sealing, especially weld-sealing, the bags 4 containing the goods 5, as soon 30 as these bags have been evacuated.

A double-layer envelope 12 is located, by means of an attachment device 7, in the upper region of the cover 3, this envelope enclosing a plate or insert 13 manufactured from a foamed material, and thereby 35 containing a predetermined volume of air. The envelope 12 and cover are approximately identical in plan view and the envelope is attached to an upper region of the cover 3 along a portion of its peripheral edge.

40 The mode of operation of the apparatus is as follows:

After lifting off the cover 3, a plurality of bags 4, containing the goods 5, are placed on the supporting surface 2 with the open ends of the bags 4 on the 45 lower beams of the welding devices 10. As soon as the apparatus has been filled, the cover 3 is placed in position, thereby closing the space 8, and the vacuum pump is set into operation. The space 8 is thus evacuated via the line 9. As a result of this 50 evacuation, the envelope 12, which encloses a predetermined volume of air, expands, a substantially flat upper wall 15 of the envelope bearing against an inner surface 6 of the cover 3, and a substantially flat lower wall 16 coming into conformal contact 55 with the bags 4, which are filled with the goods 5, and/or with the supporting surface 2. As a result of this expansion of the envelope, that part of the space 8 which must be evacuated is considerably reduced in size, thus enabling, in the case of given dimensions of the chamber, the capacity of the vacuum pump to be reduced, and/or its effectiveness to be increased, and thus enabling the evacuating operation to be carried out in a shorter time.

Since the volume of air contained in the envelope

65 12 can decrease as a result of diffusion through the

walls 15, 16 of the envelope 12, due to which effect it can no longer fulfil its assigned function with the regularity which is required, a simple measure is additionally taken, whereby the predetermined

70 volume of air in the envelope can be restored. For this purpose, as can be seen from Figure 4, the envelope 12 has a valve 20. As soon as the volume of air contained in the envelope 12 requires replenishing, the valve 20 is opened, as a result of which

75 the insert 13 expands and draws air into the envelope through the valve 20 thus ensuring that the predetermined volume of air is contained in the envelope. After closing of the valve 20, the apparatus is again completely serviceable.

80 As is evident from the above, an important feature resides in the fact that the envelope encloses a predetermined volume of air, as a result of which, although the envelope expands as the space 8 is evacuated, the pressure which the envelope exerts

85 on the goods is limited, this being necessary in order to prevent the goods 5 contained in the bags 4 from being compressed too powerfully and/or to avoid any impediment to the evacuation of the bags.

Figures 5 and 6 illustrate another embodiment of

90 apparatus according to the present invention. In this embodiment an envelope 22 possesses a shape and size approximating to the space 8. An accurately-metered quantity of air is introduced into the envelope 22, by means of a graduated cylinder (not

95 shown). The envelope 22, which is made from a completely gastight material, for example latex, is designed without a valve. In order to stabilise the envelope 22 when the cover 3 is removed, the envelope is provided, in its inner region, with a

100 four-cornered frame 23. In addition, it has two rods 17, by means of which it is attached to the inner surface 6 of the cover 3 in a manner permitting easy removal.

When the cover 3 is removed, or prior to the 105 beginning of the evacuating operation, the pressure of the air crumples or compresses the envelope 22. As soon as the evacuating operation commences, the quantity of air contained in the envelope 22 becomes effective, thereby expanding the envelope

110 22. Thus an upper wall 25 of the envelope bears against the inner surface 6 of the cover 3, and a lower wall 26 comes into conformal contact with the bags 4 which are filled with goods 5 and/or against the supporting surface 2. As a result, that part of the

115 space 8 which must be evacuated is considerably reduced in size. Since the quantity of air contained in the envelope 22 is accurately metered, pressure exerted by the envelope 22 on the bags 4 which might impede the evacuation of the bags 4, is

120 reliably avoided. The envelope 22 has approximately the shape and extent of the chamber and contains a volume of air which is significantly smaller than its volume in its unstretched or substantially unstretched condition. The volume of air which is introduced

125 into the envelope amounts to approximately 0.5% to 1% of the volume of the space 8 at atmospheric pressure.

**CLAIMS**

1. Apparatus for evacuating and sealing bags, sealable wrappers or similar items of packaging material with articles therein in a substantially gastight manner, the apparatus comprising: an evacuable chamber for receiving at least one bag, sealable wrapper or similar item of packing material with an article therein; means for sealing the at least one bag, sealable wrapper or similar item of packing material; and an envelope located in the chamber the envelope being filled with a gaseous medium and being expandable when the surrounding pressure in the chamber is reduced.
2. Apparatus as claimed in claim 1 in which the chamber is defined by a supporting surface for the at least one bag, sealable wrapper or similar item of packing material and by a cover which can be moved relative to the supporting surface, the envelope being retained by the cover.
3. Apparatus as claimed in claim 1 or 2 in which the envelope is formed by two approximately flat walls which are joined together along their outer edge.
4. Apparatus as claimed in claim 2 or claim 3 when dependent thereon in which in plan view, the envelope and cover are approximately identical, the envelope being attached to the cover along a portion of its peripheral edge.
5. Apparatus as claimed in any preceding claim in which a body made of a resiliently deformable, porous material is located inside the envelope the space inside the envelope being connected to atmosphere by means of a valve.
6. Apparatus as claimed in any of claims 1 to 4 in which the envelope has approximately the shape and extent of the chamber, and contains a volume of gaseous medium which is significantly smaller than its volume in the expanded but substantially unstretched condition.
7. Apparatus as claimed in claim 6 in which the volume of gaseous medium contained in the envelope amounts to approximately 0.5% to 1% of the volume of air which is contained in the chamber at atmospheric pressure.
8. Apparatus for evacuating and sealing bags, sealable wrappers or similar items of packaging material with articles therein in a substantially gastight manner substantially as herein described with reference to and as shown in the accompanying drawings.